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EXAMINER	
GHULAMALI, QUTBUDDIN	
ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/038,916	JIA ET AL.	
	Examiner	Art Unit	
	Qutub Ghulamali	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,18-32,34-38,40 and 41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-32,34,35 and 38* is/are allowed.

6)☒ Claim(s) *1-16,36,40 and 41* is/are rejected.

7)☒ Claim(s) *37* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgment

1. This Office Action is responsive to the Amendment filed on 08/23/2006.

2. The rejection of claims 33 and 39 under 35 U.S.C 112, second paragraph, is withdrawn in view of applicant's canceling of the claims 33 and 39.

Response to Remarks/Amendment

3. Applicant's amendment/remarks filed August 23, 2006, have been fully considered and as a result claims 1-3, 11-13 are now indicated allowable.

4. As per applicant's remarks regarding the rejection of claim 14, the examiner, after a through review of claim rejection under 35 U.S.C 103(a) contends that the limitations pertaining to CQI and the use of CQI is adequately disclosed in the art of Stein. The applicant is respectfully directed to Stein, col. 9, lines 45-61; col. 10, lines 30-38, wherein Stein show use of quality indicator in data rate determining process with rate selector 250, fig. 2. that utilizes a quality indicator to assist in making the determination of the received data rate from transmitted 100, spread spectrum modulation symbols of data rates 110, at variable rates with CRC and tail bit generator 112. Based on disclosure in Stein that similarly reads on instant claim limitation, the examiner maintains the rejection of claim 14. The rejection follows.

Claim Objections

5. Claim 37 is objected to because of the following informalities: Claim 37, line 2, after "based on the scattered", the word "pilot" needs to be inserted so as to be consistent with what is claimed in 36. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 37 recites the limitation "the combined pilot symbols" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 11, are rejected under 35 U.S.C. 103(a) as being unpatentable over ten Brink (US patent 6,611,513) in view of Stein (USP 6,175,590) and further in view of Balachandran et al (USP 6,215,827).

Regarding claims 1 and 11, Brink discloses a transmitter and a receiver adapted to transmit and receive comprising:

a symbol de-mapper (fig. 3, element 24), receiving as input a sequence of received symbols over the channel whose quality is to be measured, said symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

a soft decoder, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, said soft decoder being adapted to decode the sequence of soft data element decisions to produce a decoded output sequence (page 5, lines 22-38).

Brink, however does not explicitly disclose, an encoder, receiving as input the decoded output sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence; and

a correlator receiving as input the sequence of soft data elements to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.

Stein, in a similar field of endeavor discloses:

an encoder (236), receiving as input the decoded output (230) sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element

sequence to produce a re-encoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24); and

a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence (col. 3, lines 1-16). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an encoder to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence, and a correlator to determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data and a correlator for correlation between sequences can indicate that no error exists in the received data frame.

However, Brink and Stein as combined, does not explicitly disclose apparatus adapted to feed the channel quality indicator back to a transmitter for use in determining and applying appropriate coding and modulation to the source data element sequence. Balachandran in a similar field of endeavor discloses apparatus adapted to feed the channel quality indicator (the channel quality indication is in terms of signal to interference and noise ratio (SIR) col. 1, lines 30-33, 44-50) back to a transmitter for use in determining and applying appropriate coding and modulation to the source data

element sequence (col. 13, lines 65-67; col. 14, lines 1-44). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use feedback of quality channel indications back to a transmitter as taught by Balachandran in the combined system of Brink and Stein because the channel quality determination feedback to transmitter can allow efficient and accurate rate adjustment at transmission of coded communication data signal.

10. Claims 2, 3, 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink (USP 6,611,513) in view of Stein (USP 6,175,590) and in view of Balachandran et al (USP 6,215,827), and further in view of Jones et al (USP 6,215,813).

Regarding claims 2, 3, 12, 13, Brink, Stein and Balanchandran combined discloses all of the claimed limitations. The combination however, is silent regarding symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance. Jones in a similar field of endeavor discloses a symbol de-mapper is adapted to perform QPSK symbol de-mapping and least squared Euclidean distance to the transmission symbol from the received symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use QPSK symbol de-mapping and least squared Euclidean distance as taught by Jones in the combined system of Brink, Stein and Balachandran because it can enhance bandwidth and performance in efficiency in the system with relatively high processing gain.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4, 7, 14, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over ten Brink (US patent 6,611,513) in view of Stein (USP 6,175,590).

Regarding claims 4, and 36, Brink discloses a transmitter and a receiver adapted to transmit and receive comprising:

a symbol de-mapper (fig. 3, element 24), receiving as input a sequence of received symbols over the channel whose quality is to be measured, said symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

a soft decoder, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, said soft decoder being adapted to decode the sequence of soft data element decisions to produce a decoded output sequence (page 5, lines 22-38).

Brink, however does not explicitly disclose, an encoder, receiving as input the decoded output sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence; and

a correlator receiving as input the sequence of soft data elements to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.

Stein, in a similar field of endeavor discloses:

an encoder (236), receiving as input the decoded output (230) sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24); and

a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence (col. 3, lines 1-16). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an encoder to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence, and a correlator to determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data and a correlator for correlation between sequences can indicate that no error exists in the received data frame.

Regarding claim 7, Brink discloses, a transmitter and a receiver adapted to transmit and receive orthogonal channelized codes comprising:

receiving a sequence of OFDM symbols over the OFDM channel whose quality is to be measured (abstract; col. 2, lines 65-67);

symbol de-mapping said sequence of received symbols to produce a sequence of soft data element decision (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

decoding said sequence of soft data element decisions to produce a decoded output sequence pertaining to the source data element sequence (page 5, lines 22-38).

decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24).

Brink, however does not explicitly disclose, re-encoding said decoded output sequence to produce a re-encoded output sequence using a code identical to a code used in encoding the source data element sequence; and

correlating said re-encoded output sequence, and said sequence of soft data elements decisions to produce a channel quality indicator output.

Stein, in a similar field of endeavor discloses:

re-encoding said decoded output sequence to produce a re-encoded output sequence using a code identical to a code used in encoding the source data element sequence (col. 5, lines 57-67; col. 6, lines 1-24); and

correlating said re-encoded output sequence, and said sequence of soft data elements decisions to produce a channel quality indicator output (col. 3, lines 1-16). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an encoder to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence, and a correlator to determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data and a correlator for correlation between sequences can indicate that no error exists in the received data frame.

Regarding claim 14, Brink discloses a method of modulation and coding (encoding) comprising:

transmitting (fig. 3, element 10) over a channel a sequence of symbols produced by encoding (encoder 11) and constellation mapping a source data element sequence (col. 4, lines 60-67; col. 5, lines 1-10);

receiving a sequence of received symbols over the channel (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

symbol.de-mapping (fig. 3, element 24), said sequence of received symbols to produce to produce a sequence of soft data element decisions (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

decoding said sequence of soft data element decisions to produce a decoded output sequence (page 5, lines 22-38).

Brink, however does not explicitly disclose, an encoder, re-encoding decoded output sequence to produce a re-encoded output sequence using a code identical to a code used in encoding the source data element sequence;

correlating the re-encoded output sequence, and sequence of soft data element decisions to produce a channel quality indicator output; transmitting the channel quality indicator; and using the channel quality indicator to determine and apply an appropriate coding rate and modulation to the source data element sequence.

Stein, in a similar field of endeavor discloses:

re-encoding (236) decoded output (230) sequence to produce a re-encoded output sequence using a code identical to a code used in encoding the source data element sequence (col. 5, lines 57-67; col. 6, lines 1-24);

correlating the re-encoded output sequence, and sequence of soft data element decisions to produce a channel quality indicator output (col. 3, lines 1-16);

transmitting the channel quality indicator (col. 9, lines 45-61; col. 10, lines 30-38); and using the channel quality indicator to determine and apply an appropriate coding rate and modulation to the source data element sequence (fig. 2, col. 2, lines 30-37; col. 6, lines 47-67; col. 9, lines 45-61; col. 10, lines 30-38).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an encoder to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence, and a correlator to determining a correlation between the sequence of soft data element decisions and the re-encoded output

sequence and transmit the channel quality indicator to determine and apply an appropriate coding rate and modulation to source data elements as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data and a correlator for correlation between sequences can indicate that no error exists in the received data frame with the use of quality indicator (Yamamoto).

13. Claims 5, 6, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink (USP 6,611,513) in view of Stein (USP 6,175,590) and further in view of Jones et al (USP 6,215,813).

Regarding claims 5, 6, 15 and 16, Brink and Stein combined discloses all limitations of the claim. The combination however, does not explicitly disclose symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance. Jones in a similar field of endeavor discloses a symbol de-mapper is adapted to perform QPSK symbol de-mapping and least squared Euclidean distance to the transmission symbol from the received symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use QPSK symbol de-mapping and least squared Euclidean distance as taught by Jones in the system of Brink and Stein because it can enhance performance in bandwidth and system efficiency with relatively high processing gain.

14. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink (USP 6,611,513) in view of Stein (USP 6,175,590), and further in view of Thomas (US Pub. 2002/0051498).

Regarding claim 8, Brink and Stein in combination discloses all limitations of the claim except, disclose the symbol de-mapping is QPSK symbol de-mapping. Thomas in a similar field of endeavor discloses the symbol de-mapping is QPSK symbol de-mapping (page 6, section 0090). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use QPSK de-mapping of symbols as taught by Thomas in the combined art of Brink and Stein because it can minimize error rate in the transmission of signals and optimize synchronization.

Regarding claim 9, Brink and Stein in combination discloses all limitations of the claim except, does not explicitly show said sequence of received symbols comprises Euclidean distance conditional LLR de-mapping. Thomas in a similar field of endeavor discloses sequence of received symbols comprises Euclidean distance conditional LLR de-mapping (page 4, section 0062). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Euclidean distance conditional LLR de-mapping as taught by Thomas in the combined art of Brink and Stein because it can minimize error rate in the transmission of signals and optimize synchronization.

With reference to claim 10, Brink and Stein in combination discloses all limitations of the claim except, does not explicitly show decoding of sequence of soft data element decisions to produce output sequence further comprises using a history of the soft data element decisions, and using information about encoding of the sequence

of symbols transmitted over the channel. Thomas in a similar field of endeavor discloses decoding of sequence of soft data element decisions to produce output sequence further comprises using a history of the soft data element decisions, and using information about encoding of the sequence of symbols transmitted over the channel (page 6, section 0090). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Euclidean distance conditional LLR de-mapping as taught by Thomas in the combined art of Brink and Stein because it can minimize error rate in the transmission of signals and optimize transmission time.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

16. Claims 40-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Thomas et al (US Pub. 2002/0051498).

Regarding claim 40, Thomas discloses a transmitter wherein a set of transmission parameter signaling symbols are transmitted on the overhead channel with strong encoding such that at a receiver, they can be decoded accurately, re-encoded,

and the re-encoded symbols treated as known pilot symbols which can then be used for channel estimation (page 6, section 0091).

Regarding claim 41, Thomas discloses a receiver adapted to produce decode a received signal containing the encoded transmission parameter signaling symbols as modified by a

channel, re-encode the decoded symbols to produce known pilot, compare the received symbols with the known pilot symbols (pilot is generally regarded as part of the overhead) to produce channel estimate (see fig. 14) (page 6, sections 0091 and 0092).

Allowable Subject Matter

17. Claims 18-32, 34, 35 and 38 allowed.

18. Claim 37 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims including the claim objection.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-3014. The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QG
November 10, 2006.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER